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Artificial Insemination

With Special Reference to Scottish Conditions*

by

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In beginning a paper which contains in its title "with special reference to Scottish conditions" I must make a confession. It is, that in my lifetime I have spent exactly two weeks in Scotland. It is realised that this constitutes a handicap extending beyond the preparation of this paper and it is hoped that to-day it will explain my reluctance to detail possible local applications. Rather I shall confine my remarks to general developments in artificial insemination and to attempt to allay, in part at least, some of the fears of those who are most opposed to the widespread use of the practice in this country.

Artificial insemination as a means of livestock improvement has made rapid strides in recent years. Its basic principles have probably been known for centuries but its potentialities had never been exploited until about 20 years ago in Russia and still more recently in America and Great Britain. There were undoubtedly many factors which can account for this slow progress, but technical difficulties appear to have been the main stumbling blocks. It was the Russian development of improved methods of semen collection and semen preservation which made the practice more generally applicable. Physiological and other difficulties still prevent its widespread extension in most classes of livestock, but in dairy cattle the outstanding difficulties seem to have been surmounted. Those remaining are concerned mainly with organisation and direction, in order that the potentially increased power which it places in the hands of cattle breeders will be used for true improvement.

Within the past year at least two reviews on the technique of artificial insemination in cattle have appeared in one of the veterinary journals, in addition to the booklet prepared by the N.V.M.A. There would seem therefore to be no need for me to go over old ground and describe all methods in detail. There are, however, a few modifications of the usual technique which may be worthy of mention.

The artificial vagina is still the instrument of choice for the collection of bovine semen, but slight changes in its design are being tried. The American model utilises a rubber cone with a test tube attached in place of the collecting cup in common use in this country. This permits the use of a much shorter vagina; It is not uncommon to see vaginas 6 in. to 10 in. shorter than the standard model here. The short vagina has the advantage that ejaculation takes place directly into the rubber cone and with less danger of contamination than when the sample must be shaken down from the lumen. Dummy cows, made from a padded frame with a cowhide stretched over them, are also being used. Most bulls will react to them, but not all, so that a teaser cow is often more convenient. The use of a speculum has been almost abandoned where a large number of inseminations have to be performed on several different farms on the same day. The cervix is fixed by one hand in the rectum and the semen is deposited by means of a glass pipette to which a small glass syringe is attached by a rubber connection. A sterile pipette is used for each cow and the danger of spreading genital infection, which anything but the most complete sterilisation of the speculum between cows entails, is prevented. Moreover, it is possible to deposit the semen more advantageously, although the optimum position in the genital tract for semen deposition is still a moot point. Various operators deposit it deep in the cervix, at the bifurcation of the uterine horns, or up one horn on the side of the functioning ovary. No significant difference in results between these various sites has been found, but it seems generally agreed that any one of them is preferable to the shallow cervical deposition obtained by the use of a speculum and light, especially when high dilutions are used.

It is in the field of semen dilution that the greatest developments are taking place. The benefits to be derived from mixing semen with suitable diluents have long been evident, but it is only recently that real success has been obtained. Dilutors can be divided into those which act as dilutors only and those which, in addition, prolong the duration of sperm cell life during storage. A dilutor of the first class will prove satisfactory only if insemination is to be performed within a few hours of dilution. Most of the dilutors which have been used and advocated are of this type. Their value, if any, lies in the fact that they increase the bulk of the ejaculate, making easier the handling of the small quantities of semen necessary for insemination. They are worse than useless if storage for more than a few hours is contemplated. We are fortunate, however, in having in the egg yolk phosphate mixture, developed by Phillips and Lardy in U.S.A., a diluent which fulfils the conditions of the second class. A sample of bovine semen diluted with this material and stored at 5° C. will retain its fertilising capacity practically unimpaired for three or four days, and conceptions have occurred following the use of samples stored for over ten days. The formula is as follows:—

KH_2PO_4	...	...	0·2 grammes
Na_2HPO_4	...	...	0·8 grammes
H_2O	...	...	100 c.c.
Fresh egg yolk	...	...	100 c.c.

The phosphate buffer can be kept on hand, but it is advisable to add the egg yolk immediately before use. The dilution should be brought to approximately the same temperature as the semen before dilution takes place. Other dilutors, notably a citrate egg yolk mixture, have given equally good results, but the phosphate mixture seems to be the most widely used at present.

The maximum amount of dilutor which can be added to a good semen sample without impairing its fertilising capacity has yet to be determined. Salisbury and co-workers, at Cornell, in a recent experiment compared various dilutions ranging from 1:4 to 1:16 and found, surprisingly, that although the amount of injected material remained constant the conception rate proved equally satisfactory with the highly diluted material as with that of the lowest dilution. Nor is there reason to believe that 1:16 is the end point. But, in any case, it seems established now that a 5 c.c. ejaculate of good bull semen can be diluted and divided into sixty or seventy doses and that each dose will have about the same chance of bringing about conception as the entire original ejaculate deposited in the normal way.

It is important that only semen of good quality should be used if satisfactory results are to be expected. Unfortunately in our present state of knowledge a detailed estimation of sperm quality, based on subjective observations, may prove rather wide of the mark. The respiration rate is a useful criterion but it is not easy to obtain. The survival time of a diluted sample stored at 5° C. is also of some value in estimating fertility. But it must be remembered that semen samples from individual bulls vary within wide limits over fairly short periods of time and a bull's breeding record remains the best single indication of his future fertility. Other aids can best be used in conjunction with it.

The technical position can be summed up by saying that it is possible to collect at one time from a normally fertile bull enough semen to inseminate 60 to 70 cows, that the semen can be preserved about four days without appreciable loss of fertility, and that such collections can be repeated about twice a week. That is the position in regard to cattle breeding. The question remains, what use can we make of it? Or more particularly, what use, if any, can the Scottish dairy industry make of it?

I realise that conditions vary greatly in different parts of the world, but it will be a starting point at least to consider what is being done elsewhere. I can say very little about the Russian work. Certainly they have made great progress and we have drawn very heavily upon their experimental data. But what is possible and desirable under their system of agriculture might be neither possible nor desirable under other conditions, and as was to be expected, developments both in technique and organisation in Denmark and in America have been along rather different lines. In Denmark application of the technique in an organised way began in 1936. It was developed on co-operative lines, local groups hiring full-time veterinary surgeons to perform the inseminations and carry out necessary sterility treatments. The movement took on immediately and by 1940 they had between 30 and 40 breeding societies in operation. Precise knowledge is lacking since that time but there is reason to believe that the work has been expanded.

* Address to the annual general meeting of the Scottish Metropolitan Division, N.V.M.A., at the Royal (Dick) Veterinary College, Edinburgh, March 3rd, 1944.

In 1938 the first co-operative society was started in the United States, organised along very similar lines to the Danish societies. This group was fortunate in being assisted for the first two months by the veterinarian who had been in charge of the early Danish work and his assistance proved invaluable. The group was comprised of about one hundred members, living in an area with a radius of twenty miles and contributing an average of ten cows each. One veterinarian was employed and service was given in only one breed—the Holstein-Friesian. That same society now employs four veterinarians who will inseminate over 6,000 cows this year. Four breeds are kept—Holstein-Friesian, Guernsey, Jersey and Brown Swiss, and the area covered is only slightly larger than the original. Insemination organisations of various types have sprung up in dairy districts all over the country, the greatest numbers being in the New York and Chicago milk sheds. While the numbers inseminated are still far short of the Russian figures the increase has been steady. The total numbers bred in insemination societies since 1939 are as follows: 1939, 7,539; 1940, 23,977; 1941, 70,751; 1942, 112,788; 1943, 182,524. The inseminated cows are still only a small proportion of the dairy cattle population, but their present number represents a considerable achievement for a five-year period.

Organisation has tended to vary from the original local co-operative. In New York State a large farmers' co-operative owns 30 bulls and sells semen to 33 local units, each of which employs its own inseminator. Last year from this centre semen was provided for 20,000 cows at a cost to the local units of 10s. per cow. The cost of insemination was about 15s., so that the total cost to the farmer was about 25s. per cow. Some of these local units are as far as 200 miles from where the bulls are kept. Organisations of this size and type have an advantage in keeping down overhead costs. On the other hand, too great centralisation may tend to dilute that spirit of local co-operative endeavour which has been so great a factor in the success of some of the smaller groups. The more efficient of these smaller groups usually cover a radius of about 20 miles, employing three or four men to inseminate 4-6,000 cows. Often a line-breeding programme is attempted, a difficult policy where large numbers of bulls are kept. In fact the large New York organisation makes no attempt to line breed, but relies principally on well-proved bulls without regard to their relationship. Some breeders may criticise this system on the grounds that it will lead to lack of uniformity in type, but there is no reason to believe that that lack of uniformity will extend to productive capacity, which is what they are breeding for. In any case, such a system disposes of the argument that artificial insemination must inevitably lead to degeneration through inbreeding. Inbreeding is obviously not an automatic result of an artificial breeding programme; societies can inbreed or outcross at will just as breeders have always done.

It must be admitted that most of the research and organisational work which had led to this development of the work in America has been done by men who are not veterinary surgeons. Nevertheless, nearly all of the early societies employed veterinary surgeons as inseminators. Most of them still do, but there are large and successful groups run entirely by lay personnel. Whether or not such a policy is justified on a long-term view it undoubtedly developed due to an acute shortage of young veterinary surgeons capable and willing to undertake the work. Veterinary colleges have not, in the main, catered for the needs of these societies by major changes in curricula. In consequence graduates have often lacked not only adequate training in the technique involved, but sufficient background in genetics to advise on breeding programmes, or to maintain their own interest in the work. Whether or not this trend toward lay personnel is to be deplored is an open question. Certainly it renders more remote the hope that these societies might one day evolve into agencies for a co-ordinated attempt at dairy cattle improvement in that fuller sense which includes their health.

It is too early to assess the long-term effect of artificial insemination on American dairy cattle. But it takes little imagination to visualise the effect of using high-class bulls on a mixed cattle population over a period of three or four generations. It seems not too much to expect that in 20 years there will be whole districts with herds equal genetically to the better pure-bred herds of to-day. Already you can find many herds where most of the milking cows were got by artificial insemination and they are milking and breeding as well as the progeny of the same bulls got by natural mating. Some districts are developing a reputation for animals of a certain line of breeding. In addition these societies are having other indirect effects. Members are taking more interest in cattle breeding. They are learning to feed better in order to cash in on the increased possibilities of their cattle. Many areas show an increased interest in milk recording. The novelty has worn off and there seems to be every reason to believe that in most of the dairy districts insemination will soon be the rule rather than the exception.

So much for the position abroad. I recognise, however, even in my short stay here, a set of circumstances which do not pertain in America. For one thing the average herd appears to be larger here and the cost of natural bull service in a herd of 15 is very different from what it is in a herd of 40. In the smaller herd artificial service can be much cheaper than even scrub bull service, while in the larger herd a fairly good bull can be kept for the cost of artificial service. Telephones may be less widespread than in parts of America and they form a very important link in an artificial breeding society. There may be other differences in the same category although none of them appears to be insurmountable. But most important is a fundamental difference in attitude of the dairymen to the job of cattle breeding. I believe dairy cattle breeders can be divided roughly into two groups. In the first group can be placed those who think of their cows simply as milk producers. They are interested primarily in the efficiency with which their animals can produce dairy products for the consumer's table and their breeding programme is strictly a means to that end. If an artificial breeding society can offer to take over that programme and carry it out more efficiently they welcome it. In the second group are those who breed dairy cattle not only to make a living, but also because it is a great game. Their breeding programme is not just a means to an end, in part it is an end in itself. Many of them, but not all, are pure-bred breeders. To this group the prospect of handing over their breeding programme to a co-operative society has much less appeal.

We have both kinds of dairymen in America, but the first group predominates. No doubt you have both kinds here, but from my limited contacts I would say that the second group is much more prevalent. Certainly one finds no lack of people who are convinced that artificial breeding is an invention of the devil and that it can lead only to ruin. In what way they are seldom sure, but they rightly recognise that it introduces a new and important factor into the game, a factor unpredictable in its consequences. It is easy to sympathise with that viewpoint but I want to be shown just how it leads to ruin.

One way, it is said, is by inbreeding. In the public eye inbreeding seems to stand second only to "indiscriminate cross breeding" as a cause of animal inefficiency. Whether or not it merits the fear which it engenders, surely in a breed as numerous as the Ayrshire there need be no difficulty in avoiding it if the breeders so desire. Another way suggested is that by concentrating the bull trade in the hands of the top breeders it will ruin the small breeder, who has suddenly become the "backbone of the industry." It is inevitable that, if artificial breeding becomes widely adopted, fewer bulls will be required and the remaining trade will be retained by those who are producing the best. It follows that the less promising bulls will become unmarketable and that a number of people will be forced out of the bull breeding business. It does not follow that this would adversely affect the economy with which a quart of milk can be produced. To condemn a measure which promises to raise general efficiency in the industry because it conflicts with the interests of a few—in this case the breeders of second-rate bulls—seems strangely allied to that train of economic thought which a few years ago caused cotton to be ploughed beneath the ground and herrings to be dumped back into the sea. Scarcity of dairy products is assured for several years and when it is overcome efficiency of production will emerge even more important. It is against that fact, not its effect on bull breeding, that artificial insemination must be judged.

Another argument frequently expressed is that breeding artificially will promote lack of confidence in the pedigrees of animals so sired, thus undermining pedigree breeding and leading to the loss of foreign markets. This has not been reported from those countries which have made use of the practice for several years. In any case, recourse to the parentage test, based on the antigenic characters found in the red blood cells, should settle all disputes. This test now enjoys wide acceptance in America. Its very existence should have a good effect and not only on those who are breeding artificially. But the export trade is subject to greater dangers than those involved in artificial breeding. It has always rested on the relative superiority of British livestock to those in the importing countries, a superiority which has been steadily narrowing for almost as long as the trade has existed. That this narrowing of the gap has been due, in a large measure, to the influence of animals bred in this country does not change its implications. The oft-repeated phrase that these islands are "the stud farm of the world" begins to need re-examination. Certainly to think of them now as the stud farm of North America is to delude oneself. It is most improbable that the export trade in pedigree livestock to that quarter will ever regain its former extent, but lack of confidence in pedigrees cannot be held accountable.

There is, however, one argument against artificial insemination in Scotland to which I have no answer; I have only doubts. It is simply that Scottish cattle have been bred to such a point of uniform excellence that there is no need for any new system of breeding to improve them. This may be true—at least I am in no position to deny it. But there is some evidence that the difference in efficiency between the average herd in the country and those top few herds, which are the potential bull breeders, is great enough to justify its use on economic grounds. Overcoming the present adverse opinion of the breeders is another matter and not one which can be dismissed lightly. In this country, as elsewhere, artificial breeding will make most progress if it is promoted cautiously and only in response to a demand. Much of the present opposition is based on misinformation which will gradually disappear. When that occurs I am confident that the demand will be created. It may well be that breeders here can afford to take their time. Certainly the need for cattle improvement here is not so urgent as in most parts of the world. Scottish breeders have been masters of the old game for a long time. It will not be surprising if before long they are masters of the new.

References

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Discussion

Professor Olbrycht: I am sure that if there were opponents to artificial insemination present among the listeners they must now be convinced of the value of this promising procedure. Mr. Henderson showed us that the modern technique of collection and insemination is sufficiently developed to be used on a big scale in practice, and he has proved it, because for many years he carried out this method of breeding in the field on cattle belonging to farmers who are not willing to allow any unprofitable or dangerous experiments on their livestock. The technique of insemination used by Mr. Henderson in practice must be very effective and handy, for even in Cambridge some of the previous methods were dropped and modifications suggested by Mr. Henderson have been introduced.

I must point out that the importance of artificial insemination was realised sooner by agriculturists than by the veterinary profession. Not long ago the Committee preparing the International Congress of Veterinary Science held in Zurich in 1938 refused to agree to my proposal to include artificial insemination in the Congress discussions, giving as their reason for refusal that the Western European countries were not interested in this problem. It was only possible to persuade the Committee to include artificial insemination in the syllabus after receiving letters from Professor Kust, of Giessen, Professor Letard, of Alfort, and Professor Bonadonna, of Milan, who emphasised that this problem was of great importance and should be discussed during the Congress. All three expressed the wish to have a paper on this subject. So we persuaded the Committee to arrange a meeting on artificial insemination. We had only three papers, but there was a long discussion and many opponents to the idea.

In the following year, 1939, an International Congress of Animal Production was organised in Zurich by agriculturists and 17 papers were read on artificial insemination, most of them by men who were not veterinary surgeons. In some countries breeders demanded the use of artificial insemination, but the veterinary schools were not equipped to train specialists in this procedure. Applied insemination should be an obligatory subject for students of veterinary science, and a special laboratory for research in this problem should be attached to each veterinary college. The introduction of artificial insemination in field practice requires skilled veterinary surgeons trained specially in this method. I know cases where newly established insemination centres lost the confidence of the farmers, because the unskilled staff made big mistakes in the technique of insemination, with the result that there was a very small percentage of impregnations. Such blunders in insemination may jeopardise the future of a centre and prevent development. The method itself cannot be blamed, but the ignorance of the man applying it.

Prejudice against artificial insemination is often caused by the use of the word "artificial," which is not correct. The inseminator does not create an artificial calf, as the word "artificial" may wrongly suggest among lay people. For the process of fertilisation it is immaterial how the semen is introduced. The union of sperm with egg to form a zygote proceeds without being influenced by the inseminator in an absolutely normal way and in normal conditions. Therefore, from the scientific point of view, and to combat the prejudice against this method of breeding, it would be better to use instead the name "applied insemination." After the war it will be impossible to supply the continent with a sufficient number of breeding sires, and therefore it is essential to introduce applied insemination on a big scale.

So far as Poland is concerned, I am already making preparations for this purpose, and have worked out the design of the future organisation of applied insemination in Poland.

Polish students and veterinary surgeons released from the Army are studying this problem and we are grateful for the facilities which have been offered them here and in Cambridge.

Professor Mitchell: In spite of the remarks of Flying Officer Henderson, he was still in some doubt as to the best course of action in Scotland. Conditions in Scotland were rather different from those in the south of England. The methods used were doubtless technically sound, but it would probably take some time before Scottish farmers got over their prejudice against the project. The position at present was that the Advisory Committee were waiting for some group to volunteer to try out the practice; till that happened they were hesitant about giving instructions as to where it should be started.

He agreed about the difficulty concerning who should do the work. Veterinary supervision there must be, especially of the collection and dilution of the semen, but the actual insemination might be done by laymen instructed and supervised by veterinary surgeons.

Concerning actual organisation, he wondered whether Flying Officer Henderson would consider it feasible to have one main collecting centre for Scotland supplying a number of outlying distributing centres in suitable areas.

Mr. H. M. Wilson thought that a lot of prejudice arose from the use of the word "artificial." He could not agree as to the necessity for haste, as it was possible to get successful inseminations in cattle up to seven or eight hours after the animal was out of oestrus.

He had found some Ayrshire bulls rather sensitive and that they soon began to resent the method of collection. At the moment he was trying to design a transportable service crate and would be grateful for the speaker's comments on such a project. He would also like to have some idea of the cost of starting an insemination centre. It would seem to be at least several thousand pounds, so he wondered if there was any way of stimulating interest and building up a service gradually. He would like to know, also, how the technique could be applied on farms where the cattle ran out of doors most of the year round.

Mr. A. Foggie drew attention to one point which had not been mentioned so far, namely, the connection between artificial insemination and disease control. He was thinking particularly of Trichomonad abortion where artificial insemination would be a method of breaking the cycle of infection between bull and cow.

This method would be of particular value in districts of small holdings where communal bulls were used.

Professor T. M. Olbrycht: The point brought up by Mr. Foggie was very important. With the aid of applied insemination we could prevent the spread not only of Trichomonas but also of Bang's abortion and many other contagious diseases.

With reference to the cost of an insemination centre, the cheapest way was to dispense with buildings and staff by simply buying a bull and keeping it on a private farm. The farmer was paid for the animal's keep and it might also be arranged that his own bull be used as a reserve. The only other expense would be in the remuneration of a veterinary surgeon to do the inseminations.

Sir Arthur Olver: There was one aspect of artificial insemination to which he would like to refer, *viz.*, the difficulty they encountered in India with Zebu bulls, that they did not go on serving for many years and therefore there was very great difficulty in obtaining fully proved bulls. By the time an animal was fully proved, it had not infrequently ceased to function. There, he thought, artificial insemination might be of great help, for by inseminating a large number of heifers from a young bull, a clear idea of his usefulness could be obtained much earlier in its effective life.

In areas where it was customary to use communal bulls, and where there was a wide gap between the quality of the ordinary stock and that of selected bulls, artificial insemination could obviously be of value in improving the general standard of the cattle as well as for checking the spread of disease. Whether conditions in Scotland generally were suitable for its use was another question. Obviously, there was a good deal of prejudice to be lived down, but he felt that once it got started its use would gradually extend.

Dr. McEwen: Mr. Henderson implied that those in charge of artificial insemination centres should be geneticists and that the veterinary surgeon having little or no knowledge of genetics was unsuitable. It would be interesting to know whether scientific genetics really were applied at artificial insemination centres or whether the geneticists at these centres followed empirical methods that demanded no more than a superficial knowledge of genetics. Was the closing of the gap between the quality of the cattle in North America and this country due to the application of the scientific findings of geneticists, whereas in this country only empirical breeding methods had been followed? Where four thousand guineas and similar sums were paid for bulls for export to North America and elsewhere, was the value determined on the advice of the scientist? If a basic knowledge of genetics now played an important part in such matters, surely the geneticists must be commanding very attractive salaries or fees and some of those students now present might well consider transferring their attentions to those attractive prospects.

The Reply

Flying Officer Henderson: He was sure Professor Mitchell would understand his hesitancy in recommending a specific course of action for Scotland without more knowledge of local conditions. He could not agree with the principle of veterinary supervision of lay inseminators if by that was meant having veterinarians in charge of centres with laymen doing the inseminating. In the regrettable event of those projects being completely divorced from disease control it seemed inevitable that laymen would be trained as inseminators. But the insemination was the key link in the chain and if laymen could be trained to do it, the case for veterinary control in the sense outlined rested on very thin ground. He thought it would be possible to have one main collecting centre for at least the south of Scotland; he doubted if it would be desirable.

The necessity for haste arose from the fact that not all requests for semen were for cows early in oestrus. Many were for cows late in oestrus or even off oestrus. It was not often that bulls resented the method of collection. He had seen it occur when the vagina was used at too high a temperature and when rough liners were used. A transportable crate would certainly be advantageous if it could be so constructed that it would not tip over in use. Costs of insemination centres varied tremendously, but elaborate equipment and buildings were not essential. The principal costs were bulls and buildings. Sometimes an arrangement could be made with a local breeder. This plan seemed to offer the best chance to a practitioner. On most farms where the cattle ran out all the year round natural breeding would seem to have many advantages, except in the case of dairy herds stabled for milking.

He agreed with the advisability of using artificial insemination to control outbreaks of trichomoniasis. He did not believe, however, that it would prove of much value in preventing the spread of Bang's disease.

He did not wish to imply that those in charge of stations should be primarily geneticists. But if veterinary surgeons were in charge he thought they should have a thorough knowledge of the application of genetics to animal breeding. It was true that some centres used empirical methods; on the other hand, some took great care in devising a breeding programme. There seemed to be ample evidence to prove that deference to scientific principles would pay in the long term view. He could not speak of breeding methods employed in this country, but a large measure of the improvement which had occurred in America had been brought about by the infiltration of improved breeding methods from the scientific institutions to the breeders. It was improbable that the value set upon many of the high-priced bulls exported to America in recent years was determined upon the advice of scientists; nor was it probable that the scale of prices paid was closely correlated with actual merit. No one, whether he were a quack or a scientist, was likely to attain great riches through artificial breeding, but if any of the young men present thought of going into it they would be well advised to learn all there was to know about its rules and implications, or they might find themselves doing one job and equipped for another.

Weekly Wisdom

"God directs nature, according as the universal laws of nature, but not according as the particular laws of human nature require; and so God has regard, not of the human race only, but of entire nature.

Our desire is not that nature may obey us, but, on the contrary, that we may obey nature."—Baruch Spinoza (1633-67): Tractatus Theologico-Politicus.

Livestock Improvement and Artificial Insemination

Discussion by North of England V.M.A.*

Professor W. M. Mitchell: He felt somewhat embarrassed to find that he was addressing a company of veterinary surgeons and farmers, as he had expected to speak only to the former, so he hoped that he would be excused if he directed most of what he had to say to the consideration of the technical aspects of artificial insemination and its repercussions on professional work. He was not intimately acquainted with the practice of dairy farming in the North of England, but he understood that there were districts where the cow population was made up of small herds, so that there was likely to be a demand for one or more A.I. centres once the advantages of artificial insemination were explained to farmers.

Veterinary surgeons, as trusted advisers of the farming community, would probably be asked for their opinion upon this method of livestock improvement, so it was important that they should know how an A.I. scheme worked and how it would benefit the farmer. He thought it was only natural for practitioners to be slightly jealous of any scheme which involved yet another veterinary official entering their districts and making close contact with their clients, but if they were satisfied that this method of livestock improvement would not injure their practices they would probably welcome this development. Lord De La Warr had recently focused attention on the fact that visitors to this country from North America had been rather shocked at the poor quality of many of our commercial herds. There was no doubt our best stock was second to none, but how to diminish the gap between our best pedigree stock and the poor quality commercial stock in the quickest possible way required an immediate effort to rectify the position.

He thought that artificial insemination supplied a very economic and practical way of doing this and the method should commend itself when the advantages to be gained were more widely known. Very briefly, some of the advantages might be stated as: (1) The farmer did not require to buy a bull, thus saving in initial expense, housing, feeding and handling. (2) There would be no necessity to transport cows to a neighbour's bull because semen would be brought to the cow. (3) The risks of infection from a communal bull would be avoided. (4) By using good bulls, preferably progeny tested, the young stock would be of increased value, and progressive farmers would probably aim at building up self-contained pedigree herds. (5) Under A.I. schemes, the fertility of the bull could be constantly checked. This was important because fertility varied from bull to bull and from time to time. (6) Control of infertility in cows. Insemination required inspection and manipulation of the genital passage and experienced persons doing insemination work would come to appreciate pathological conditions of the genital passage which would otherwise escape notice. In this way useless animals from a breeding point of view would be directed to the slaughterhouse without delay and owners advised to obtain the services of their own veterinary surgeon for those likely to benefit from treatment.

With regard to the technical side of artificial insemination, he thought that it was essential that the man in charge of an A.I. centre should be a veterinary surgeon. He should possess certain qualities. He would require a certain amount of administrative ability, also laboratory training and practical gynaecological experience based upon a good knowledge of the physiology of sex.

Before appointment to the independent charge of an A.I. centre, every veterinary surgeon should gain practical experience at some established centre, and at present he thought the Cambridge Centre should undertake such training. The veterinary surgeon in charge of a centre would require a good stockman, who would be in charge of the stud animals, also a clerk, who might also be a laboratory technician. Then it would be necessary to have lay inseminators, and he thought that one inseminator might be sufficient for a centre dealing with about 2,000 cows, the veterinary surgeon doing a limited amount of artificial insemination work himself.

Office control would have to be rigid, as all cows registered under an A.I. scheme would need to have a full record kept of their breeding history, and there would also be the registration of their calves.

With regard to laboratory duties, he stressed the importance of maintaining a high standard of purity. Though artificial insemination eliminated the risks of infection by a communal bull, if laboratory technique should become lax at an A.I. centre, pathogenic organisms might gain access to semen at any stage from its collection to final insemination, particularly when being examined microscopically for sperm content and motility and at the time of dilution with egg-yolk mixture.

Much of the routine work of insemination of cows he thought could be quite well left to trained lay inseminators, who should have sufficient training to recognise gross deviations from normal genital health. When the genital health of a cow was doubtful, the lay inseminator would defer insemination until the veterinary surgeon in charge of the centre had examined the animal. Likewise, cows which failed to settle after two or three services should be examined by the veterinary surgeon. He thought it was a most soul-destroying job to expect a veterinary surgeon in charge of an A.I. centre, who had undergone a broad professional training, to spend most of his time as an inseminator of normal cows. With lay inseminators under his control, the veterinary surgeon could concentrate to a greater extent on becoming an expert in the diseases of the genital system.

Here he thought collaboration between the veterinary surgeon in charge of an A.I. centre and local practitioners would be to their mutual advantage. Not all veterinary practitioners were, or desired to be, expert gynaecologists, and he thought there was need for a considerable number of specialists throughout the country capable of assisting and advising practitioners in the control of the diseases of the genital organs.

Mr. J. P. Pickering was inclined to disagree with the previous speakers. Dr. Hammond had stated that progeny tested bulls were difficult to obtain and also that he considered that a station could not operate much beyond a 15 mile radius. Was it true that semen was difficult to transport long distances? Why was this so? He had heard that it would keep for three days, while in Russia it had been transported very much longer distances than would be needed in Britain. Would it not be better to have fewer stations and allow the cows to be inseminated by veterinary practitioners, rather than to have many stations, each with a whole-time veterinarian in charge?

In reply, Dr. Hammond said that this was certainly an important point. One of his colleagues had just returned from the United States and had produced arguments both for and against the establishment of many centres. His own opinion was that it would be less wasteful to have many stations, the point being that semen would have to be sent to sub-stations or to practitioners each morning, and as one never knew how much would be required, one would have to work up the maximum and this would involve a good deal of waste. There was another defect in having fewer centres. Each county was now looking after local needs in the matter of livestock improvement and this tended to rule out long distance transport of semen. After all, one had to get types of animals suitable for the local environment and he thought this was a strong argument for the institution of centres locally, perhaps one in each county. He agreed, however, that a large station would be less costly to run than a number of small ones.

Mr. J. P. Pickering asked if he was correctly informed that one of the Shorthorn bulls at the Cambridge Station had actually been obtained from the North. In reply, Dr. Hammond said that was so, but he was only got because a better bull could not be obtained nearer. Dr. Hammond thought that the veterinary practitioner should be consulted and probably should inseminate in the case of valuable pedigree animals, but for the small commercial farmer he did not think this was suitable since it would occupy far too much of the practitioner's time.

Mr. J. D. Peele thanked the speakers and asked if he could be informed as to what official regulations were now in force at A.I. centres. "Can one take semen from bulls locally and inseminate, say, another client's cows?" "What effect would the establishment of these centres have on the panel scheme, which already paid a good deal of attention to the treatment of sterility and pregnancy diagnosis?" In reply, Dr. Hammond thought that the panel scheme had certainly the promise of much good. His experience had been that the veterinary officer at the artificial insemination centres did not have time to treat the cows for genital diseases. He merely advised the farmer that treatment was necessary and that it should be carried out by a practitioner. He thought, therefore, that this officer, in a manner of speaking, acted as an advertising agent for the panel scheme. Farmers taking part in the insemination scheme were dealing with more valuable stock, and he found that they looked after them much better. He, therefore, thought that the centre should not run counter to the panel scheme but, on the contrary, that each should be complementary to the other. The Ministry of Agriculture had issued a regulation that no one could sell semen without a licence. Professor Mitchell said that in Scotland they had gone one better and no one could even distribute semen without a licence.

The President (Mr. T. M. Mitchell) was also concerned with regard to the possible repercussions of A.I. centres on the panel scheme. He would like to ask whether it was the small stock-owner or the large stock-owner who was keener on artificial insemination.

* Discussion on an illustrated address by Dr. John Hammond, of the School of Agriculture, Cambridge, following a demonstration of the technique employed in the artificial insemination of cattle. The occasion was the annual general meeting of the North of England Division, N.V.M.A., held at the School of Agriculture, Houghall, near Durham, on March 31st, 1944.

Had pedigree owners any rooted objections to artificial insemination? Would it be possible for owners who had second-class cows to register only a portion of their herds with an A.I. centre? He thought it was tragic to see so many good cows bred with scrub bulls, and this, in his experience, had been ruinous to certain breeds of cattle. For example, 30 years ago one saw few Ayrshire cattle in the North-East. Nowadays there were very many Ayrshire herds and the pure Shorthorns were now very much in the minority. He would like to have heard a good deal more about the breeding of the dual purpose Shorthorn cow, which he thought was an excellent animal in many respects.

Dr. HAMMOND stated that he had no quarrel with "dual purpose"; the trouble was that so many cattle were "no purpose." He agreed that the country must have more beef and the only way to get it in quantity was to breed dual purpose animals. This could be done as, for example, at the Cambridge University Farm, where they had an average of 800 to 900 gallons of milk from animals which also bred good beef steers. Great attention must be paid to the question of breeding. There was room for dual purpose cattle in every district. Yes, it was usual to admit a portion of a herd to enrolment at an A.I. centre. He thought this was necessary in order to give the farmer confidence in the technique, and he generally found that farmers became very keen on the idea. Interest in A.I. centres was by no means confined to small owners. Large owners who bred bulls were also interested. In Cambridge over a period of 17 months they had not lost a single member. It was customary to charge pedigree breeders £5 per service because it was desirable that they should retain their bulls in order that the supply of well-bred bulls might be kept up. There was at the moment a lamentable shortage of progeny-tested bulls. In the United States, out of 49 sons of a proven bull 47 had been found capable of increasing milk yields, and at another centre, out of 117 sons of a proven bull only 15 had failed to elevate milk yields in herds already giving 1,000 gallons. He thought that in this country rearing bulls to sell at £50 or so did not really pay, but bull rearing would pay if they could be sold for some hundreds of pounds. Therefore, if pedigree breeders would rear five bulls instead of 25 and sell them at an enhanced figure, he thought that this would be a good thing. There was no doubt that the small owner gained much more under A.I., but in Cambridge they had both large and small owners co-operating. At the Cambridge centre pregnancy diagnosis was done by the veterinary officer in charge, but he would not care to say whether he thought this would be advisable at other centres. He did not think that the work at the centre would cut across the panel scheme.

Mr. L. DENT: He had been intensely interested in what he had heard. He would like to ask, however, what effect artificial insemination would be likely to have after a number of years. As a farmer his experience had been that interference with nature always brought about bad effects and he wondered if we had sufficient experience of artificial insemination to anticipate any drawbacks. In reply, Dr. HAMMOND said that in no country were there more than four generations of animals produced by artificial insemination and so far there was no evidence that it had given rise to any defects in the stock. It was most unlikely that it would, as, after all, it was the method which had been adopted by the plant breeder. With regard to the point about interference with nature, people undoubtedly thought artificial insemination was wrong. Personally he could see nothing wrong with it. It was merely a stage in livestock improvement, the first stage of which was castration. Castration was necessary in the interests of livestock improvement and artificial insemination was only one other step forward. But it did involve a close study of stock judging and this needed all the help that science could bring to bear on it. If artificial insemination was beneficial it was obvious that it could, if not properly applied, be an instrument of causing great harm.

Another speaker asked whether the use of old sires would not produce stock lacking in constitution. Dr. HAMMOND replied by stating that there was no reason to think that this was so. Further, there was no danger of in-breeding because at each centre two stud animals of the same breed must be kept. The breeds kept would naturally be those in greatest demand at any particular centre. It was necessary to keep a type of bull which was in demand in order that the centre should be run on business lines. There could also be a federation of the smaller stations in order that other semen, not ordinarily kept, could be available. He would like to point out that in-breeding was only bad when one was doing it with bad stock. For example, the Jersey breed, although all coming from the same country, were remarkably free from in-breeding. He would point out, however, that in pigs very close in-breeding had been carried out and the stock was still going strong, but he did not advise close in-breeding unless the ancestry of the stock was well known.

Mr. I. W. CASSELS thanked both Dr. Hammond and Professor Mitchell. He stated he had just returned from the United States and while many things he had heard might be taken with a grain of salt, he was convinced of the wonderful effect on livestock improvement which had been brought about by proven sires under artificial insemination. He thought that in Durham they had all the problems which had been referred to that afternoon. His committee were wrestling with the problems of livestock improvement locally and the discussion he had heard that afternoon would, he thought, be of considerable value in helping them to come to a decision on the matter. He was very pleased to welcome the meeting to the School and hoped that they would return soon.

CLINICAL COMMUNICATION

Unusual Case of Strychnine Poisoning

L. R. GEFFEN, M.R.C.V.S.,
KENSINGTON, W.8

Subject.—A cross-bred smooth-coated terrier bitch, seven-and-a-half months of age.

This dog was first seen at about 4 p.m. on the tenth of March. She had been left alone in a flat since noon and when her owner returned at 3 p.m. she was seen to be ill.

The dog exhibited all the symptoms of acute strychnine poisoning and showed all the reactions to the stimuli of light and sound. The owner was carefully questioned and assured me that the dog had not been out off the lead and had picked up no rubbish; also that no rat bait had been put down in the flat and it was therefore not possible for the dog to have been poisoned.

An injection of 1½ c.c. of solution morphine 5 per cent. with hyoscine 0·5 per cent. was given. At the end of 20 minutes this had not controlled the spasms and a further 1 c.c. was administered. When the animal was quiet it was sent home and the owner given instructions regarding nursing. Twenty minutes later the owner telephoned to ask if Easton's Syrup was poisonous. It appeared that the cat had knocked a box containing twelve 1-dram size tablets of Easton's Syrup from the mantelpiece and that the dog had eaten eleven of them.

The dog made an uninterrupted recovery. Apparently she must have been allowed out unknown to her owner during her previous heat period, for on April 29th, only seven weeks later, she gave birth to a healthy litter.

ABSTRACTS

[The Anthelmintic Efficiency of Phenothiazine in Sheep. (Capsule, Bolus, Drench and Soybean Pellets.) THORNING, W. M., SAMPSON, J., and GRAHAM, R. (1944.) *J. Amer. vet. med. Ass.* **104.** 67-72.]

Thorning *et al.* have compared the anthelmintic efficiency of phenothiazine when administered in five different ways. Their experiment was made on 60 wormy lambs, bought in the open market, and divided as to weight and clinical condition into six approximately uniform groups of ten lambs each. The average weight of the lambs in each group was 53·3 lb. All groups were fed a basal ration of clover hay *ad libitum* and a corn and oats mixture with block salt, and at no time during the experiment were climatic conditions considered to be favourable for parasitic worm larvae to develop on the ground, which was covered with a layer of cinders. Each lamb in groups 1 to 4 received as a single dose the following treatment: Group 1, 15 grammes powdered commercial phenothiazine in a gelatine capsule; Group 2, 12·5 grammes of the drug in the form of a bolus; Group 3, a drench of 1 fluid oz. of a commercial aqueous colloidal suspension of phenothiazine containing 12 grammes of the drug; Group 4, a drench of 2 fluid oz. of a water-molasses (in equal proportions) suspension containing 15 grammes of the drug per dose. The lambs in Group 5 were fed soybean pellets, each consisting of 5 per cent. mineral, 6 per cent. molasses, 89 per cent. soybean-oil meal and into which phenothiazine was incorporated. Half a pound of pellets containing approximately 13·5 grammes of the drug was allowed per lamb which ate the pellets more readily when broken into small pieces. Group 6 was used as untreated controls. An analysis of the data obtained from pre- and post-treatment periodic faecal examinations for worm egg counts, from haemoglobin determinations, gains in weight and clinical appearance of the lambs during the experimental period shows that no significant difference between the treated groups was noticeable. Infestations

with *Haemonchus* and *Oesophagostomum* were lowered, while those with *Strongyloides*, *Nematodirus* and *Trichuris* were not appreciably affected. In the treated groups, the lambs showed an average daily rate of gain of 0·28 lb. as compared with 0·12 lb. for the control lambs and there was a general improvement in health of treated as contrasted with untreated lambs.

J. N. O.

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[Malignant Lymphoid Tumours in Horses. Runnells, R. A., and Benbrook, E. A. (1944.) *J. Amer. vet. med. Ass.* **104.** 148.]

In a series of over 600 tumours examined during the past 20 years the authors have encountered six cases of lymphoid tumour in the horse. All were examples of lymphocytoma (malignant lymphoma, lymphosarcoma). It is not known whether the tumours were accompanied by leukaemia since in no case was the blood picture examined : there were no symptoms suggesting either lymphatic leukaemia or pseudoleukaemia, however. The age of the animals varied from five to 23 years. In two animals the primary growth had not yet metastasised (submaxillary lymph node, conjunctiva); in the third it was situated in the liver (may have been secondary, but the primary growth was not found); in the fourth animal the primary growths involved the lymph follicles of the small intestine and rectum and there were metastases in the mesenteric lymph nodes.

The two remaining animals showed widespread lymphoid hyperplasia. In one the primary growth in the parotid region had produced secondary tumours in a thyroid gland, the cervical lymph nodes, lungs and bronchial nodes, pancreas, bladder, ureter and myocardium. The remaining case is of special interest because the histological features closely resembled those of Hodgkin's disease in man (giant cells with scattered rather than peripherally arranged nuclei, eosinophil infiltration and fibrosis). The tumours were found in the left olfactory bulb, cervical, prepectoral, mesenteric and sacral lymph nodes, and localised areas of the small intestine.

E. G. W.

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[The Diagnosis of Canine Leptospirosis. Coffin, D. L., and Stubbs, E. L. (1944.) *J. Amer. vet. med. Ass.* **104.** 152-157. (16 refs.).]

This article is based on the clinical study of many cases of canine leptospirosis with serological and cultural tests in some cases throughout the whole course of the disease.

Leptospira canicola was the cause of 85 per cent. of cases in Philadelphia (*L. icterohaemorrhagiae* presumably being responsible for the remainder). Symptoms are divided into first and second stage and the latter into icteric and haemorrhagic forms. For two to five days there is fever to 106·5° F., stiff gait, orange red membranes and congested tongue, pharynx and tonsils. Dry, flat ulcers of lips and dysentery or black pasty faeces may be seen. Vomition is common and emaciation sets in early.

Diagnostic features now manifest themselves and fever rapidly abates, often to subnormal. Haemorrhagic cases emaciate rapidly, have a very harsh skin and seem narcosed with temperature down to 96° F. Their breath and smell are urinous and mouth ulcers with bloody vomit and faeces are common. Jaundice cases rarely emaciate rapidly and maintain a more normal temperature. Blood changes show counts of W.B.C.s up to 50,000, mostly neutrophiles and many immature. R.B.C.s are not greatly affected but nucleated cells and reticulocytes may be seen and dehydration may give increased counts and haemoglobin levels. Bile may be found in serum before jaundice is noted and urea-nitrogen levels indicate definite uraemia. Urine tests for albumen, sediment, bile and indicanuria are usually positive and Sp. Gr. rather low (1·012 to 1·030).

Differential diagnosis is well outlined as regards distemper, Stuttgart disease, jaundice and uraemic conditions, "blacktongue" (vitamin A or B complex deficiencies), etc.

Laboratory diagnosis includes histopathological studies and micro- and macroscopical agglutination-lysis tests which are detailed. Neither of the latter aids treatment much as the reactions only occur up to one week from the onset of the disease, but they confirm diagnosis in otherwise doubtful cases.

C. V. W.

The delegation of the British Royal Commission on higher education in the colonies, which, reinforced by local representatives, has been visiting the Caribbean, is prepared to recommend the establishment of a West Indian University. It is to be a unified institution rather than a federation of local colleges, but centres for extra-mural studies are to be provided.

REVIEW

[War-time Information for Pharmacists. (Third Edition.) Published by the Pharmaceutical Press, 17, Bloomsbury Square, London, W.C.1. Price 1s. 6d., post free.]

This booklet at the modest price of 1s. 6d. contains a vast amount of information in summary form and arranged alphabetically.

It extends to but 80 pages but deals with no less than 308 items. Much of the information relates to war-time legislation and is of particular interest to pharmacists but, that apart, there remains good value for money in other information that is certainly of interest to veterinarians either professionally or as general knowledge.

That this is the third edition since the outbreak of war shows that there is need for such a publication and also that the booklet has been well appreciated.

QUESTIONS IN PARLIAMENT

Veterinary Surgeons

General Sir George Jeffreys asked the Secretary of State for War how many veterinary surgeons are now serving in the Army in branches other than the R.A.V.C.; and whether, in view of the serious shortage of veterinary surgeons, he will cause any such veterinarians to be either transferred to the R.A.V.C. or placed at the disposal of the Minister of Agriculture for service under his Ministry.

Sir J. Grigg: The answer to the first part of this Question is 57. Many of them have been trained for combatant duties and my hon. and gallant Friend will appreciate that it will be impossible to withdraw them from their units at the present time. I am, however, considering the transfer of other veterinary surgeons to meet some at least of the requirements of the Royal Army Veterinary Corps.

Sir G. Jeffreys: Will my right hon. Friend consider withdrawing in due course those officers who are employed on combatant duties, in view of the great shortage of veterinary surgeons and the great necessity for all qualified men to be practising?

Sir J. Grigg: I will consider it, but I do not by any means hold out any hopes that people will be withdrawn from their very important combatant duties.

At a later session, Mr. Colman asked the Minister of Agriculture whether he is aware of the serious situation which is arising owing to the shortage of veterinary surgeons; and what steps he is taking to prevent further members of this profession being called up for military service.

The Minister of Agriculture (Mr. R. S. Hudson): The question of the allocation of veterinary surgeons to meet the requirements of agriculture and of the Army is receiving the consideration of my right hon. Friends the Minister of Labour and National Service and the Secretary of State for War and myself.

Mr. Colman: Is my right hon. Friend aware that the shortage of veterinary surgeons is already seriously affecting the welfare of all kinds of high-class British livestock? Does he appreciate how extremely serious the matter is?

Mr. Mathers: Will the Minister try to make sure that only qualified persons are allowed to practise in this field?

. . . . .

Soil Fertility

Mr. Wootton-Davies asked the Minister of Agriculture to what extent his advisers have reported any depreciation in the soil during the war.

Mr. Hudson: My information is that, taking the country as a whole, the fertility of the soil has during the war been maintained.

. . . . .

Flag Day (Animals)

Wing-Commander James asked the Secretary of State for the Home Department the capital resources and the last year's published income and overhead expenses of each of the twelve societies benefiting from the recent Animal Flag Day; and state how much they received from that day.

Mr. H. Morrison: I regret that I cannot give the information asked for in the first part of my hon. and gallant Friend's Question. As regards collections from the Flag Day, the police regulations require these accounts to be submitted to the Commissioner of Police, and to be published in the Press, within a month from the date of collection, which will be June 16th. I understand that, in present circumstances, an extension of time may have to be allowed.

NOTES AND NEWS

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

June 20th.—Meeting of the North Midland Division, N.V.M.A., Grand Hotel, Sheffield, 2.30 p.m.
June 21st.—Meeting of the Section of Comparative Medicine, Royal Society of Medicine, in conjunction with the Institute for the Study of Animal Behaviour, at 1, Wimpole Street, W.1, 2.15 for 2.30 p.m.
June 21st.—Meeting of the Society of Veterinary Practitioners, Station Hotel, Perth, 2.15 p.m.
June 22nd.—Meeting of the Society of Veterinary Practitioners, Royal Station Hotel, Newcastle-on-Tyne, 2.15 p.m.
June 23rd.—Meeting of the Society of Veterinary Practitioners, Bull and Royal Hotel, Preston, 2.15 p.m.
June 23rd.—Annual General Meeting of Sussex Division, N.V.M.A., at Hayworthe Hotel, Haywards Heath, 2.15 p.m.
June 23rd.—Meeting of the Scottish Metropolitan Division, N.V.M.A., in the Royal (Dick) Veterinary College, 2.30 p.m.
June 27th.—R.C.V.S. Examinations begin (provisional date).
June 28th.—Meeting of the Society of Veterinary Practitioners, Castle Hotel, Taunton, 2.15 p.m.

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The New President of the Royal College of Veterinary Surgeons

Mr. Thomas Marshall Mitchell, M.R.C.V.S., D.V.S.M., of Sunderland, has been elected President of the Royal College of Veterinary Surgeons for the year 1944-45, to succeed Mr. Wm. Nairn. Mr. Mitchell was elected to the Council in 1932, the year in which the number of members on the Council was increased to 36 by the addition of four members elected by practitioners resident in Eire. Mr. Mitchell has served on the Finance, Registration and Library Committees. He was Vice-Chairman of the Finance Committee while Mr. Nairn was Chairman, and succeeded to the Chairmanship when Mr. Nairn became President. He has thus passed through a useful apprenticeship. We hope to give a fuller account of Mr. Mitchell's professional career in an early issue.

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Veterinary Surgeons as Expert Witnesses

RIGHTS WHILE ATTENDING COURT

At the instance of a Division of the N.V.M.A., one of whose members complained of his exclusion from a Court of Summary Jurisdiction during the hearing of a case at which he was in attendance to give expert evidence, the Association has secured legal opinion on the rights of members of the profession in these circumstances.

The Association is advised that a Court of Summary Jurisdiction, *e.g.*, the Police Court, cannot enforce an order that an expert witness shall leave the Court during the hearing of the particular case with reference to which he is called upon to give expert evidence, whereas ordinary witnesses as to facts may be excluded. If requested to leave the Court, therefore, the veterinary witness should ask for the authority for such a request or order. It appears, however, that the right to be present is based not so much upon any particular "section of the Law" but upon "usual practice"—it being doubtful if a Court of Summary Jurisdiction could enforce an order that an expert witness should leave the Court, because should he refuse to do so such refusal would not amount to contempt of court.

The above ruling, however, does not apply to the High Court—or, incidentally to the Coroner's Court, as both have the necessary authority to enforce any request or order that all witnesses shall leave the Court.

[It is recorded in our issue of March 30th, 1935, that Dr. Bullock, replying to an enquiry addressed to him on discussion of his paper "The veterinary surgeon in the witness box," affirmed the right of veterinary surgeons called as expert witnesses to remain in Court, adding that if they were asked to leave they should assert their right to remain.]

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R.C.V.S. OBITUARY

BOWIE, A. R. C., St. Andrews. Graduated December 16th, 1922. Died June 7th, 1944.

DUDGEON, David, Sunderland. Graduated May 23rd, 1898. Died June 1st, 1944.

HALFHEAD, Wm. D., Crawley Downs. Graduated December 19th, 1908. Died March 19th, 1944.

SUTTON, Guy, F.R.C.V.S., Major late R.A.V.C., of 6, Holland Park Avenue, W., and 165, Church Street, Kensington, W. Graduated London, July 17th, 1902; Fellowship May 15th, 1909. Died June 11th, 1944.

Major Guy Sutton died at St. Mary's Hospital after a short illness, and the passing of a second member of the well-known West London veterinary partnership which originally included the late Sir Frederick Hobday, will be widely mourned. We hope to make further reference to Major Sutton's career in a later issue.

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Post of Veterinary Inspector, City of Edinburgh

In connection with the above appointment, advertised in our last issue, we understand that, in the particulars supplied to intending applicants, this post is referred to as that of Chief Veterinary Inspector. In these circumstances, we must express disappointment that the scale of salary offered for this important appointment commences, it is now clear, at a figure below the minimum initial salary recommended by the N.V.M.A. for such a post.

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PERSONAL

Birth.—HUNTER.—On May 28th, 1944, to Brenda (*née* Stewart, M.R.C.V.S.), wife of W. M. D. Hunter, M.R.C.V.S., of Milford, Co. Donegal—a son.

Marriage.—STORRAR—DARGUE.—On June 7th, at Gartsherrie Parish Church, Coatbridge, David Storrar, M.R.C.V.S., Darlington, only son of Mr. and Mrs. Storrar, Westholme, Townhead Road, Coatbridge, to Janie, W.A.A.F., daughter of Mrs. Dargue, Forest Hall, Kendal.

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LEGAL NOTES

Unqualified Practitioner Fined.—At South Western Police Court recently, the Magistrate, Sir Gervais Rentoul, fined C. G. Connerton, of Balham High Road, who carries on an animal surgery, £5, with £10 10s. costs, for causing unnecessary suffering to a cat. The evidence showed that the owner, noticing that the cat had a swollen ear, took it to defendant, who said it would need an operation and must be left for eleven days. She agreed to pay 30s. When defendant returned the cat it was in a filthy and deplorable condition, very weak and hardly able to walk. The owner then took the cat to a veterinary surgeon, and in a week it improved greatly.

Herbert Arnold, of Cato Road, a police officer, said that when the cat was taken to defendant it was in excellent condition. He thought defendant was a qualified man. When the cat was returned it was a "bag of bones." Blood was coming from its eyes and nose, and it was too ill to stand.

Inspector Edwards, of the R.S.P.C.A., said he saw defendant and told him the cat did not appear to have had elementary treatment. Defendant said, "The cat went off its food some days after it came here and would not eat. It was in a bad way, so I took it back."

In reply to the magistrate, witness said he had occasionally had complaints about cases taken to "M.N.S.A.C. places." "It is not recognised," he added, "and is a quackery."

Mr. Richard Evans, the veterinary surgeon to whom the cat was eventually taken, spoke to finding it thin and emaciated, unable to stand and filthy. The eyes, nose and mouth were discharging, and he diagnosed feline distemper. He treated the ear, which appeared to have been neglected. He did not know what M.N.S.A.C. stood for.

Counsel for defendant: Are you saying that defendant makes himself out to be a member of the Royal College of Veterinary Surgeons?

Witness: I think it is a cloak.

Defendant, in evidence, said he was a member of the National Society of Animal Consultants, a body of men and women who had not had the opportunity of passing through a veterinary college. There was an examination recognised by the Society.

After the operation, the cat's ear was treated every day. It would not eat and had to be forcibly fed. He later noticed it had distemper, which it might have had before it was brought to him. He gave it proper treatment, but it lost weight owing to fretfulness.

In reply to Mr. Jones, for the R.S.P.C.A., defendant denied that the real reason for placing the letters M.N.S.A.C. after his name was to make people believe that he was a qualified practitioner.

MAGISTRATE'S COMMENTS

The Magistrate said he had reached the conclusion that the defendant did not display the proper degree of care that he should have done, and to some extent caused unnecessary suffering. The defendant held himself out to be a person specially qualified to deal with animals. To begin with, he earned his living in that way, and he put after his name some rather mysterious initials of a

society which seemed to have no definite recognition. He stated an examination was held, but whether it amounted to anything at all was open to argument.

From the public point of view it was most undesirable that letters of that kind should be used in such circumstances, because it had the result of misleading the public into imagining they were going to someone who had qualifications for dealing with such matters. Defendant, in fact, had none, except some knowledge he had been able to pick up. It was not suggested that the operation was improperly performed, but there was evidence of subsequent neglect. It might be that the cat had got distemper through mischance, but that did not account for the dirty state it was in.

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COLONIAL DEVELOPMENT

Further developments since the publication of its progress report four months ago are announced by the Colonial Research Committee in its first annual report.

In the interval approval has been given to the plans under consideration when the former report was published, and ten more schemes, costing £190,850, have also been approved for grants under the Colonial Development and Welfare Act, 1940.

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VETERINARY SCHOOL FOR AFRICANS AT VOM

The Colonial Office announces the completion at Vom, Northern Nigeria, of the new veterinary training school for Africans, where students who have completed their basic science course are now in residence. It will be open to pupils from all parts of the Colony and from other parts of British West Africa.

The announcement continues: "This important new training centre for African veterinary officers is part of Nigeria's policy of modernising the farming methods of the people. After their training the students from Vom will carry out such work as the supervision of the immunisation of cattle against rinderpest and other diseases, investigating outbreaks of disease and taking charge of animal clinics.

"The new school has been built on the most modern lines. There are roomy well-equipped laboratories, a lecture room and a spacious library and museum. Near by is a large clinic containing a pharmacy and an operating theatre and stables and kennels for animal patients. The research laboratories and the farm are in the immediate vicinity. Careful attention has also been paid to the accommodation of the students. There are married and single quarters, and playing fields and a squash court are to be provided. No fees are to be paid by the students and each will receive a subsistence allowance of £36 a year while registered at the school. After successfully graduating from Vom students will be admitted to the Government service.

"The work of Nigeria's Veterinary Department has grown in importance since the war and will undoubtedly play a big part in the development of the Colony's dairy farming, livestock and hide industries. The function of the Department is, at the same time, not confined to the prevention and eradication of such diseases as rinderpest, pleuro-pneumonia, blackwater and anthrax. It includes also the prevention of animal suffering. Another development in Nigeria's veterinary services is the opening of animal clinics, built by native administration, for the healing of wounds, the cure of lameness and the destruction of animals where no cure is possible.

"Emphasis is placed on the importance of a sound elementary education for young men who wish to take up the scientific and professional careers that are opening up for them in Nigeria. Educational leaders in the Colony are advised that English should be taught at an early age so that pupils can qualify for admission to the schools offering courses of technical training."

* * * * *

H.M. STATIONERY OFFICE PUBLICATIONS

The undermentioned has been published recently. Copies can be purchased through any bookseller, or directly from H.M. Stationery Office.

	Price net	Post free
	s. d.	s. d.
Command Papers (Session 1943-44):		
[6532.] Colonial Development and Welfare Act, 1940. Return of Schemes made under the Act, by the Secretary of State for the Colonies with the concurrence of the Treasury in the period from April 1st, 1943, to March 31st, 1944	0 3	0 4
[6535.] Colonial Research Committee, 1st Annual Report, 1943-44	0 2	0 3
Agriculture and Fisheries, Ministry of:		
Leaflet, Advisory No. 319. Soil Sterilisation. Each	0 1	0 2

SCHEME FOR THE CONTROL OF DISEASES OF DAIRY CATTLE

Statement Showing the Number of Undertakings Notified to the Ministry of Agriculture during the Month Ending May 31, 1944

County	Undertakings Notified		Total Undertakings		
	During Month	Previously	Number	Number of Cattle	
				Cows	Heifers
Scotland					
Aberdeen	—	27	27	1,168	402
Angus	1	20	21	812	395
Argyll	—	6	6	113	115
Ayr	—	39	39	1,257	955
Banff	—	4	4	121	42
Berwick	—	2	2	53	22
Bute	—	—	—	—	—
Caithness	—	—	—	—	—
Clackmannan ..	1	5	6	201	152
Dumfries	—	13	13	672	553
Dumbarton	—	3	3	105	86
East Lothian ..	—	3	3	145	88
Fife	1	34	35	1,352	585
Inverness	—	10	10	340	192
Kincardine	—	5	5	231	126
Kinross	—	3	3	59	32
Kirkcudbright ..	—	15	15	886	701
Lanark	1	19	20	683	486
Midothian	—	1	1	44	69
Moray	—	—	—	—	—
Nairn	—	1	1	14	—
Orkney	—	—	—	—	—
Peebles	—	5	5	101	45
Perth	—	33	33	752	428
Renfrew	—	9	9	384	297
Ross-shire	—	3	3	89	65
Roxburgh	—	—	—	—	—
Selkirk	—	—	—	—	—
Stirling	1	28	29	848	648
Sutherland	—	4	4	102	64
West Lothian ..	—	1	1	23	18
Wigtown	1	25	26	1,698	858
Zetland	—	—	—	—	—
Totals ..	6	318	324	12,262	7,424

Notes.—(1) Duration of undertakings: 1 year, 47; 2 years, 38; 3 years, 239. (2) Undertakngs renewed for a further period (included in column 2 of statement): 1 year, 28; 2 years, 4; 3 years, 3. (3) Undertakings expired and not renewed (not included in column 2 of statement): 50. (4) The figures showing the number of undertakings notified during the month relate to entirely fresh undertakings.

* * * * * *

MINISTRY OF AGRICULTURE NEWS SERVICE

Old Straw Bad for Pig Bedding.—There are pneumonia losses each winter amongst pigs that have been bedded on old, dry, partially pulverised straw. In referring to this, Canadian veterinary authorities point out that pigs sleeping on such bedding inhale the dry straw dust, which is apt to bring on irritation of the lungs and even pneumonia. Draughty quarters and insanitary condition make matters worse. Straw is plentiful, and the best preventives are to maintain clean, fresh bedding and quarters which are warm as well as being free from draughts.

. . . . . .

Treating Poultry for Worms.—Poultry, like other stock, occasionally harbour parasites in the digestive tract. The most common parasite is the round worm. This pest, when mature, is about 1½ to 2 inches long and pointed at both ends. Occasionally individual specimens are found on the droppings board, but this is no indication of serious infection. Indeed, a few such worms in a bird probably do no harm. It is only when they multiply excessively that the birds lose condition and go out of lay.

The life history is simple, for the worm lays eggs which pass out with the droppings. These eggs, after about a week outside the bird, are ripe for further development. If at this stage they are eaten by a fowl they develop into adult worms and so the cycle is complete.

Treatment is simple, but do not start wholesale dosing unless the veterinary surgeon recommends it. Remember that a week outside the bird is necessary for ripening, so if droppings are removed daily the risk of infection is almost entirely removed. Even with severe infection, frequent cleaning is the most effective treatment and will often clear up the infection.

. . . . . .

Guarding Against Coccidiosis.—Coccidiosis results in the loss of birds and wasted feeding-stuffs. Chickens and turkey poults are most frequently attacked and the critical period is from the second to the tenth week of life.

Excessive moisture in the brooder-house and, particularly, a combination of moisture and warmth may lead to the rapid development of the coccidiosis parasite in the droppings. There

fore, as far as possible, keep the brooder-house dry and well ventilated. Drinking water should be raised off the ground and placed away from that part of the brooder-house where the chicks are likely to do most picking and scratching.

If effective measures are to be taken to curtail an epidemic among a group of chickens, it is essential to diagnose the disease correctly. The frequent appearance of blood in the droppings is a useful but not an infallible guide. It is advisable not to attempt to cure affected birds, but rather to try to prevent the spread of disease to the healthy. Useful measures include rearing on wire-netting floors, with regular cleansing and keeping a separate piece of ground for chick-rearing, on which adult birds are never allowed. Houses containing affected chicks should be thoroughly cleaned out once every 48 hours. When the chicks have been removed, the houses should be cleaned out and thoroughly sprayed with a 10 per cent. solution of household ammonia in warm water, a most effective disinfectant for the destruction of the parasite. After such treatment the houses should remain empty for some hours until all traces of ammonia have disappeared.

Directly trouble is suspected the wisest course is to apply to the veterinary surgeon for information and advice.

* * * * *

Crops and Stock.—At the end of 1943 the percentage acreage in this country of individual crops *above that of pre-war level* was: wheat 86·5, oats 52·8, cereals 80·0, potatoes 91·6, vegetables 53·6.

Livestock population for the same period showed an increase of 6·4 per cent. in total cattle, but decreases of 21·6 per cent. in sheep, 59·3 in pigs and 33·5 in poultry.

* * * * * *

Lean or Fat Bacon?—At a recent discussion on "Pigs on the Farm" it was generally agreed that the future of the industry in this country lay, not with the specialist large-scale producer with his hundreds of pigs concentrated in a small area, but with the general mixed farmer—a few pigs on every farm. The numbers kept would need to be related to the size of the farm so that the animals could be used for the purpose of consuming the surpluses and by-products of a balanced farm economy.

Another interesting discussion point was raised by the question: "Would the British public demand the same young lean bacon after the war as they had done so before?" It was argued that in pre-war years the public had developed "artificial" tastes in most things. They wanted flavourless foods—immature bacon, tasteless butter and "baby" beef. If taste reverted to a liking for a heavier and fatter type of bacon it would have a marked effect upon the future of the pig industry. Many problems of feeding would be overcome, for the pre-war pig was only just beginning to be a useful consumer of farm by-products when it had to be killed so that its carcase would give the type of bacon then required.

CORRESPONDENCE

The Editor will be glad to receive items of professional interest for inclusion in these columns.

The views expressed in letters addressed to the Editor represent the personal views of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

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VETERINARY EDUCATION

To the Editor of The Veterinary Record

Sir,—The publication of the Loveday Report suggests the following considerations to those interested in veterinary education:—

1. The academic and financial standard for a typical veterinary school set up by the Martin Committee in this country in 1928. A department was established in each major subject under a professor with a full complement of lecturers and demonstrators, and with adequate buildings and equipment. The minimum stipend allocated to each professor was that required by the University of London; if and when, as was hoped, the post became a university professorship. This standard was accepted by the Government and operated. The members of the Martin Committee were unanimous in this decision, and the Committee included such medical names as Sir Charles Martin, Sir Walter Morley Fletcher, and Sir Cooper Perry, and such laymen as Sir Merrik Burrell and Sir Archibald Weigall, together with four representative veterinary men. So far from preserving the standard set by the Martin Committee, the Loveday Committee actually reduces both status and stipend of representatives of major veterinary subjects. Professorships are reduced to lectureships and stipends are reduced by two to three hundred pounds a year. Anyone acquainted with university organisation will appreciate the enormous importance of this reduction in status.

2. The institution of a full veterinary degree by the University of Liverpool 30 years ago. Although intentionally designed to demand a longer course and greater effort than are required for the licensing diploma, 118 students were reading for this degree in 1938. They were doing this voluntarily, and sought the degree solely as evidence of academic achievement, as it is not a licence to practise. This fine spirit for university veterinary education and the figures are a record unequalled in any other university. The Loveday Committee would undermine this spirit and high ideal, and substitute for this degree, which is such an unqualified academic success, a compulsory degree of commercial value.

3. The granting of the first autonomous faculty to veterinary representatives by the University of Berne. This placed them, inside the university, on a plane of equality with representatives of arts, science, law, medicine, etc., and opened to them in turn the avenues to the highest university positions including the rectorship. The response they made is generally recognised in Switzerland and elsewhere. The Loveday Committee fails completely to appreciate the meaning of this, the greatest epoch in the history of university veterinary education.

There is no case for the claim of the Loveday Committee that, in order to secure financial support, the profession should surrender its form of government, which is the best example of democratic professional government in this country, or its one uniform portal of entrance (as is the case with the profession of law) which the veterinary profession has enjoyed for one hundred years. Under the existing system with the governing body of the profession acting in co-operation with the university, no profession has made greater progress during the past 40 years. In making this claim I do so after working for 35 years in a British university alongside representatives of other professions, a unique experience in this profession, and one for which my gratitude is profound.

Yours faithfully,

Pentrebychan Hall, John Share Jones.
Nr. Wrexham, Denbighshire.

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THE LOVEDAY REPORT AND THE PROFESSION

Sir,—Presumably Mr. Paul Crosfield, in his letter in your issue of May 27th, set out to support the Loveday Report, and to show that our one-portal system is safe if it is accepted. If this is so, it is difficult to understand why he goes out of his way to be gratuitously caustic about colleagues who happen to hold opinions on the matter other than his own. Indeed, what a poor lot generally we veterinary surgeons are, according to Mr. Crosfield. We are totally devoid of realism; for our sins we are responsible for the continued prevalence of a number of preventable diseases—will members of the medical profession please note? We have "no books of any kind in our houses," and "We are determined to stand against the stream of progress." Then, wandering into either the sociological, political, or military spheres, we are warned that "this country is on the verge of great changes"; we are informed that "the Conservative Party stands far further Left than did the Liberal Party of Mr. Asquith." Lastly comes the dreadful ultimatum that "if we do not realise this, we shall remain the Cinderella of the professions." This mixed lot of *statements* may, or may not, be true or interesting, but what I fail to see is in what way they are relevant to the themes of the Loveday Report and one-portal system. If this is a sample of the "realism" of Mr. Crosfield in dealing with his subject, well, "we are not amused"—or impressed. Does Mr. Crosfield forget the record of his profession in combating and controlling many animal scourges of the past; does he remember that, just a short century ago, our calling was mainly an empiric craft, and will he be realistic as to its scientific status to-day? Will he also recall that the present effort by means of the survey scheme to deal with preventable diseases is largely due to the work and vision of his fellow general practitioners?

But on one point Mr. Crosfield is realistic. He realises that the Loveday Report needs "clarification" and "firm handling" as to "the exact meaning of 'registrable degree' and as to 'who is to decide what is a registrable degree';" precisely, here is some realism at last. Mr. Crosfield thinks these are the only points in the Report needing to be cleared up, but quite a lot of us think there are a number of others, and each of them equally vital or equally fatal. But he need not doubt that all members of the profession want progress. We want all practicable "co-operation" with the universities; increased powers for our Royal College; extended scope and improved teaching facilities for our colleges, and financial help to provide them. A few words or a few phrases in an Act of Parliament may decide the price to be paid for these boons, and the profession may soon be asked to decide whether it is willing to pay it. May we hope that all will demand stern realism on the question as to whether the R.C.V.S. is to become the Cinderella or remain the real mistress in the house she has managed so well for so long. "To be or not to be, that is the question," and it is far from being clearly answered yet, as Mr. Crosfield realises.

Yours faithfully,

Sandy Lane. Prestatyn, N. Wales. E. P. Edwards.
June 3rd, 1944.

EXCERPTS FROM THE LOVEDAY REPORT (ISSUES OF *THE VETERINARY RECORD*)

Sir,—After having read and re-read the Report of the Loveday Committee, I have endeavoured to cut off a large portion of the luxuriant growth and get into the pith of the subject.

Clause 10.—"Of the four schools Liverpool has no margin for expansion."

"Glasgow premises are inadequate for the number of students there, and we are not prepared to recommend the establishment of a school at this centre on the scale and of the type of those at London and Edinburgh."

"We recommend that at Glasgow a veterinary school should be established by the University with an annual output of 30 graduates."

Clause 12.—"The establishment of veterinary education is dependent on the following conditions: (*a*) that the financial assistance will be provided by the State; (*b*) that the degree in veterinary medicine given by the centre should be a registrable qualification; (*c*) that the university should have control over the courses and examinations."

"*V.R.*"—*Page 169.*—Cambridge: "We are encouraged to believe that the University authorities might be prepared . . . to propose the necessary change of statute which would enable the University to grant a degree in veterinary medicine."

Glasgow: "We found ourselves unable to recommend that assistance should be given from public funds"; "that the College should be reorganised and rehoused"; "the University of Glasgow becoming responsible for the first three years"; "the subjects of the fourth and fifth years being taught under the Governors of the College in new buildings."

"The University authorities are willing to undertake the sole responsibility for the whole training at Glasgow"; "bringing agricultural and veterinary training into close relationship under the University."

Clause 15.—"Veterinary studies must therefore be given full university status, a degree becoming a registrable qualification; and we recommend that steps be taken to this end."

Clause 16.—"Degrees in veterinary science or veterinary medicine are to be registrable qualifications to practise"; "and that he has been well trained in diagnosis and practical work"; "and clients assured."

"*V.R.*"—*Additional note on page 177.*—"We suggest that a degree which leads to qualification to practise should uniformly be termed a degree in veterinary medicine."

Might one ask if students obtain a degree in veterinary medicine after three years' tuition at the university, being registrable and licensed to practise, or must it only be granted after an additional two years in clinical medicine and surgery at an adjacent school?

Finally, let it be clearly stated that the authors know that a university cannot grant a licence to practise until the statute of the Royal College of Veterinary Surgeons is torn to pieces.

These notes were prepared from the Reports of the Loveday Committee printed in the issues of *The Veterinary Record* of May 20th and 27th.

Yours faithfully,
An Old Student.

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MUTUAL DEFENCE

Sir,—Some weeks ago you published in *The Veterinary Record* a short account of a County Court action in which we were sued for "Negligence and breach of contract." We won the action with costs, but nevertheless our out-of-pocket expenses were not small. We are pleased to tell you that the whole of these have been refunded to us by the National Veterinary Benevolent and Mutual Defence Society.

We are,
Yours truly,
Sutton, Stainton & Ollerhead.

165, Kensington Church Street, W.8.
June 6th, 1944.

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"DISEASES OF SHEEP": AN APPRECIATION

Sir,—So far no one has paused for a moment to congratulate the members of the Survey Committee responsible therefor on the recently published "Diseases of Sheep," N.V.M.A. Publications: No. 6. I would like to do so, and to say how informative and valuable I find it. Many of us have little to do with sheep, but when we do, absence of a reliable reference book has made the task more difficult. This publication should be invaluable to many practitioners, and it is to be hoped that the Survey Committee may be prompted to continue the good work and cover other classes of stock such as pigs and horses. Expensive encyclopaedias and text-books soon get out of date and if the Committee can keep us "up to date" in this way—sending periodical addenda as research work makes these desirable—it will perform a very great service to the profession and to agriculture.

Yours faithfully,
"Fairfield," T. A. R. Chipperfield.
Crowborough Hill, Crowborough.
June 12th, 1944.

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R.C.V.S. COUNCIL ELECTION

Sir,—May I express my sincere thanks to those 515 colleagues who kindly supported me by their votes in the recent election to Council, R.C.V.S. Though I missed a seat by a matter of only 30 votes, I am very gratified to find that I secured 55 more votes this year than I did when last nominated—in 1940.

My endeavour will be to retain, and even further to increase that measure of confidence which the veterinary electorate has expressed in my political views.

Yours faithfully,
658, Finchley Road, N.W.11. H. Kirk.
June 12th, 1944.

Sir,—I shall be glad if I may use your columns to express my sincere thanks to the members who supported me in the recent Council election of the Royal College of Veterinary Surgeons.

Whilst fully desirous of the betterment and advancement of the profession, I shall spare no effort to ensure that the autonomy of government vested in the members is fully maintained as one of our most valuable and cherished rights of the profession.

Yours faithfully,
Friars House, A. B. Mattinson.
Bamber Bridge, Preston.
June 10th, 1944.

Sir,—Would you kindly allow me to use your correspondence column in order to thank those members who voted for me in the recent R.C.V.S. election.

I will do my best to implement the promises made in my election address.

Yours faithfully,
Pennard House, Sevenoaks. L. P. Pugh.
June 6th, 1944.

Sir,—My most grateful thanks to those Fellows and members of the Royal College of Veterinary Surgeons who have returned me for a third term of office on its Council.

I can assure them—as well as those who did not give me one of their votes—that the only axe which I intend to continue to grind, has as its blade the veterinary profession and its handle the R.C.V.S.

This I shall on all occasions wield to the best of my ability, both to protect, and to advance, your interests, *my profession*.

Yours faithfully,
"Rothiemurchus," J. F. D. Tutt.
St. Cross, Winchester.
June 6th, 1944.

DISEASES OF ANIMALS ACTS, 1894 TO 1937, AND AGRICULTURE ACT, 1937 (PART IV).

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Parasitic Mange*	Sheep Scab	Swine Fever
May 1st to 15th, 1944 ...	8	—	—	—	52
Corresponding period in—					
1943 ...	16	—	—	3	15
1942 ...	12	1	—	5	23
1941 ...	32	9	—	11	36
Total Jan. 1st to May 15, 1944	94	19	5	58	266
Corresponding period in—					
1943 ...	134	10	5	97	203
1942 ...	126	12	26	110	164
1941 ...	216	218	7	125	675

Note.—The figures for the current year are approximate only.
* Excluding outbreaks in Army Horses.